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# CHROMOSOME NUMBERS IN *LACHENALIA* (LILIACEAE)

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## Abstract

Chromosome counts are reported for forty-one collections of *Lachenalia*, representing sixteen species and numerous additional undetermined collections, ones of uncertain status, or undescribed species. Chromosome numbers of n = 5, 6, 7, 8, 9, 10, 11, 12, 14, 16, 18, 22 and 28 were obtained. Chromosomal races are recorded in some species. For *Lachenalia*, it is probable that x = 5, 6, 7, 8 and 9.

## Uittreksel

## CHROMOSOOMGETALLE IN *LACHENALIA* (LILIACEAE)

Chromosoomgetalle in 41 versamelings van *Lachenalia* word vermeld. Dit sluit 16 soorte en baie ander ongeïdentifiseerde versamelings, soorte van onsekere status en onbeskryfde soorte in. Getalle van n = 5, 6, 7, 8, 9, 10, 11, 12, 14, 16, 18, 22, en 28 is verkry. Chromosomaal-rasse is aangetref by sekere soorte. In *Lachenalia* is dit waarskynlik dat x = 5, 6, 7, 8, en 9 is.

## Introduction

*Lachenalia* is a genus of ca. 90 species (Barker, pers. comm.) endemic to South Africa and South West Africa (Namibia); most species occur in the south-western Cape Province in an area with a Mediterranean climate. Though the lines between many species are clear cut, in others there are intergradations and other morphological variation patterns that have led to taxonomic confusion (Moffett, 1936). Two workers have made chromosomal studies of the genus (Moffett, 1936; de Wet, 1957); their counts plus scattered counts made by other workers have revealed chromosome numbers of 2n = 14, 16, 22, 26, 28, 32, 42, and 56. During 1970–71, and in 1974, the first author collected *Lachenalia* in the Cape Province, sent the bulbs to Berkeley, and initiated a chromosomal survey of the genus. The results of this survey are reported herein.

## Material and Methods

Floral buds of cultivated specimens were fixed in 3:1 glacial acetic acid: absolute ethanol, transferred to 70 % ethanol after fixation, refrigerated, and anthers removed, squashed in acetocarmine. The resultant preparations were examined with a microscope and the number of chromosomes determined.

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TABLE 1.

Chromosome numbers in *Lachenalia*.

| *Species* | *n* = | Author's collection number and locality | Previous reports |
|---|---|---|---|
| aff. algoensis Schoenl. | 7 | 7386: Caledon | |
| aff. aloides (L.f.) Hort | 14 | 7704: Elgin | |
| bulbifera Cyrillo | 14 | 7159: Strandfontein | |
| contaminata Ait. | 8 | 7339: Breërivier | |
| | 8 | 7377: betw. Worcester and Villiersdorp | |
| elegans Barker | 14 | 7444: Bulshoek Dam | |
| | 14 | 7419: Pakhuis Pass | |
| | 28 | 7417: Pakhuis Pass | |
| | 28 | 7449: Pakhuis Pass | |
| aff. fistulosa Bak. | 7 | 7229: Caledon | |
| | 7 | 7342: Goudini | |
| hirta Thunb. | 11 | 7137: Ezelfontein | 2n = 24 (de Wet, 1957) |
| juncifolia Bak. | 11 | 7511: Op-Die-Berg | |
| longibracteata Phillips | 7 | 7095: Mamre Rd. Station | |
| | 7 | 7431: Bulshoek Dam | |
| mutabilis Sweet | 5 | 7072: Klawer | 2n = 14, 56 (de Wet, 1957) |
| | 5[a] | 7211: Clanwilliam | |
| orchioides (L.) Ait. | 7 | 7344: Ceres | 2n = 16 (de Wet, 1957);<br>2n = 16, 17 (Moffett, 1936) |
| | 14 | 7157: Kalbaskraal | |
| pallida Lindl. | 8 | 7307: Mamre | |
| | 8[b] | 7353: Paarl | |
| pustulata Jacq. | 8 | 7117: Steenbergs Cove | |
| purpureo-caerulea Jacq. | 8 | 7522: Darling | |
| trichophylla Bak. | 7 | 7429: Bidouw Valley | |
| unicolor Jacq. | 8 | 7130: Kapteinskloof | |
| | 8 | 7421: Bidouw Valley | |
| aff. unicolor Jacq. | 8 | 7127: Aurora | |
| unifolia Jacq. | 11 | 7163: Darling | |
| | 11 | 7368: Brandvlei Dam | |
| | 11 | 7515: Citrusdal | 2n = 21, 22, 24, 26 (de Wet, 1957) |
| violacea Jacq. | 7 | 7439: Bulshoek Dam | |
| Undescribed species: | | | |
| aff. hirta | 11 | 7193: Spektakel Pass | |
| | 9 | 7356: Worcester | |
| Unidentified species: | | | |
| | 5 | 8024: Clanwilliam | |
| | 5 | 8033: Clanwilliam | |
| | 6 | 7954: Spektakel Pass | |
| | 8 | 7952: Okiep | |
| | 8 | 7973: betw. Vredendal and Vanrhynsdorp | |
| | 8 | 8044: Pakhuis Pass | |
| | 8 | 8051: Bidouw Valley | |
| | 9 | 8036: N11 and Douse the Glim Rd. | |

[a] reciprocal translocation present

[b] fragment present

## RESULTS

Forty-one collections were examined representing 16 species and several undetermined collections, those of uncertain taxonomic status, and two undescribed species. Chromosome numbers of 2n = 10, 12, 14, 16, 18, 22, 28, and 56 were obtained (Table 1).

## DISCUSSION

It is clear that *Lachenalia* is chromosomally more diverse than previously reported, since our counts of 2n = 10, 12, and 18 are new for the genus. Clearly several base numbers exist: x = 5, 6, 7, 8, and 9. The high diploid numbers can be considered polyploid ones based on various combinations of these base numbers, though it is possible that higher, non-polyploid base numbers may also exist. Few cytological aberrations were noted; a reciprocal translocation was noted in one collection of *L. mutabilis*, and a fragment was observed in a collection of *L. pallida*. For several taxa intraspecific polyploidy exists. Diploids and tetraploids occur in *L. orchioides*; tetraploids and octoploids occur in *L. elegans*. In the latter, populations with the two chromosome numbers occur very near each other. For some species, reports by other workers indicate the existence of chromosomal races at other levels. For example, two collections of *L. mutabilis* had n = 5, whereas de Wet (1957) reported 2n = 14 and 56 for plants attributed to this species. Likewise, in *L. orchioides* and its close relatives, n = 7 and 14 are reported herein, whereas both de Wet (1957) and Moffett (1936) reported 2n = 16; the latter worker also recorded 2n = 17 for this species. For *L. unifolia*, n = 11 is reported from three widely separated populations; de Wet (1957) reported 2n = 21, 22, 24, and 26 for this species.

Barker (unpub.) has recognized two provisional, major and as yet unnamed groups within *Lachenalia* based on seed characters. All named taxa in Table 1 with n = 7, 14, or 28 fall into group 1 except for *L. trichophylla*, which has been assigned to group 2. However, Barker (pers. comm.) states that the seed of *L. trichophylla* is so distinctive that it and several other species with similar seeds may be relegated to still a third group. However, we have obtained n = 5 for *L. mutabilis*, also a member of group 1, although de Wet (1957) obtained numbers for this species based on x = 7. All species we have examined with n = 8 and 11 fall into group 3.

It is thus clear that not only is *Lachenalia* a variable genus in its morphology, but it is also unusually variable in chromosome numbers. The diverse chromosome numbers reported for various species groups in this genus suggest particularly problematical assemblages that merit further cytotaxonomic study.

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